



Tuesday, October 5

18:00 Reception

Wednesday, October 6

08:00 Breakfast

09:00 Opening

Stephen Prusha (JPL): Opening Remarks

09:20 **Customer Keynote**

"The Utility of Decision-Based Structures"

Stephen Prusha, JPL

09:45 Coffee

10:15 **Session 1-- Customer Plenary Session**

Panel Chair: Stephen Prusha

Discussion about the use of design/decision rationale or similar information and/or structures in support of Agency or institutional strategic planning; the limitations perceived due to the lack of existence of "Decision Based Design Structures;" and the projections for the future utility and expectations in this area.

Key questions to be addressed:

- To what extent, and to what level is the *rationale* supporting mission, program, or institutional decisions identified, considered, documented, or challenged during the strategic planning process?
- What is your perception of the value of this type of supporting information?
- How specifically is *design* information (e.g. mission design) used in the planning process?
- What is your perception of the practical utility of this information, in both the construct and defense of planning conclusions?
- What are the key driving requirements for these design/decision structures?
- What is the nature of the product (structure) itself, and how is it similar or related to road-mapping structures currently being developed or used for Agency planning?
- To what extent can this knowledge be useful in:
 - Formulating an overall program of missions?
 - Selection of technologies for avenues of research to promote for funding, development and infusion?
 - Communicating and/or defending results, to both technical and non-technical audiences?

Panelists:

Doug Stetson – Advanced Planning and Integration Office, NASA Headquarters/JPL

Erik Antonsson – Chief Technologist, JPL

Harley Thronson – Assistant Associate Administrator for Technology, Science Mission Directorate, NASA Headquarters

12:00 Lunch

13:00 **Session 2 –Plenary Short talks**
Session Chair: Robert E. Oberto

Discuss specific Requirements & Utility of Decision Based Design Structures for Space Applications. Emphasis in this session will be on the application of decision-based structures supporting design processes and mishap/anomaly investigations (i.e. post-design analysis).

Key questions to be addressed:

- What is a design *structure*, and how are various designs currently represented?
- How is a design structure utilized or *executed*?
- How might these structures or this information be useful to, and used by, the design community?
- How is design rationale assembled and considered during the conduct of a mishap investigation? What is its relative value?
- How might the development of these structures be influenced by the emergence of model-based design and/or simulation-based acquisition processes?
- Have decision capture methods been successfully deployed in aerospace design environments? What have we learned and how does it affect future developments?
- What are the practical implications of capturing design decisions *during* the design process vs. *after* a design is converged?

1) *Dr. David Ullman*: "Decision Management to Capture & Query Design Rationale."

2) *Robert E. Oberto*: "The Utility of Decision Based Design Structures for Concurrent, Conceptual Design"

3) *Dr. Tina Panontin*: "Lessons Learned from Investigations & Utility of Decision Based Design Structures for post design analysis"

4) *Lynne Cooper*: "Investigating post-project (or post-key-milestone) learning and capturing of key design/decision information."

14:30 **Session 3 -- Working Groups; Parallel sessions.**

The workshop attendees break into three or four groups. Each of these groups will include representatives from the customer community and the various branches of the technology provider community. Each group will address the same set of questions.

S3-1 --Identify desired capability and utility (see working groups link)

Lead: Robert E. Oberto

Recorder/Facilitator: Leila Meshkat

S3-2 - Identify desired capability & utility

Lead: David Ullman

Recorder/Facilitator: Martin Feather

S3-3 - Identify desired capability & utility

Lead:Dr. Tina Panontin

Recorder/Facilitator: Lynne Cooper

16:00 **Session 4 -- Group gathering to exchange results; here the entire group will gather to exchange the results obtained in each of the sessions**
Chair: Robert E. Oberto

Thursday, October 7

08:00 Breakfast

09:00	<p>Session 5 -- Technical Plenary Session- the state of the art and future directions in the field of Decision Based Design Structures"</p> <p>Discussion about the state of the art in the fields of Formal Engineering Design, Risk Based Decision Making in Design, and Design Rationale and how these fields can be integrated to permeate the field of "Decision Based Design Structures".</p> <p>Panel Chair: Martin Feather <i>Prof. Elisabeth Paté-Cornell, Stanford University.</i> : "The role of probabilistic risk analysis and decision analysis in the development process of large complex systems" <i>Prof. Linda Schmidt, University of Maryland:</i> "Decision Based Design Techniques for Conceptual Design" <i>Prof. Nancy Leveson, MIT:</i> "Integrating Design Rationale into the System Engineering Specification Environment." <i>Prof. Nam Suh, MIT:</i> "Design of Complex Systems"</p>
10:30	Coffee
10:45	<p>Technical Keynote</p> <p>Principles of Decision Analysis Relevant to Design" Prof. Ralph Keeney, Duke University</p>
12:00	Lunch
13:00	<p>Session 6 – Plenary Short talks: "Brainstorming/ Machine learning/ Reasoning" Chair: Tim Menzies</p> <ol style="list-style-type: none"> 1. <i>Prof. Tom Stahovich:</i> "Reasoning about early life-cycle diagrams". 2. <i>Dr. Jane Malin:</i> "Early Life-Cycle Simulations" 3. <i>Prof. Tim Menzies & Prof. Jim Kiper:</i> "Contradiction-Tolerant Simulation" 4. <i>Dr. Martin Feather:</i> "Experiences, both good and bad, using a risk-centric representation for decision support"
14:00	<p>Session 7: Working Groups/Parallel Sessions The workshop attendees break into three groups. Each of these groups will include representatives from the customer community and the various branches of the technology provider community. Each group will address the same set of questions.</p> <p>S7-1 --Identify the state of practice: tools & techniques Lead: Tim Menzies Recorder/Facilitator: Martin Feather</p> <p>S7-2 - Identify the state of practice:tools & techniques Lead: Tom Stahovich Recorder/Facilitator: Leila Meshkat</p> <p>S7-3 - Identify the state of practice:tools & applications Lead: Steve Cornford Recorder/Facilitator: Chester Borden</p>
15:00	Coffee
15:10	<p>Session 8 -- Group gathering to exchange results Chair: Steve Cornford</p>
17:30	Social Event: Bus leaves for dinner cruise.

Friday, October 8

08:00	Breakfast
09:00	<p>Session 9 – Short talks: Design Structures & Decision Analysis Chair: Steve Cornford</p> <ol style="list-style-type: none"> 1. <i>Mike Yukish:</i> "The ARL Trade-Space Visualizer: An Engineering Decision Making Tool" 2. <i>Prof. Stephen Lu:</i> "Collaborative Negotiation in Engineering Design"

10:00 **Session 10 -- Working Group/Parallel Sessions**

S10-1 –Identify areas of R&D

Lead: Robert E. Oberto

Recorder/Facilitator: Leila Meshkat

S10-2 - Identify ares of R&D

Lead: Steve Cornford

Recorder/Facilitator: Martin Feather

S10-3 - Identify areas of R&D

Lead: Dave Ullman

Recorder/Facilitator: Mike Yukish

11:00	Coffee
11:15	Session 11 -- Group gathering to exchange results Chair: Steve Cornford
12:00	Lunch
13:00	Session 12- All/Workshop Summary Co-Chairs: Stephen L. Prusha & Stephen Lu
15:00	Coffee
15:15	Wrap Up